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United States Patent [19]

Sakai et al.

[11] **Patent Number:** 5,674,301[45] **Date of Patent:** Oct. 7, 1997[54] **HYDROGEN PREPARING APPARATUS**

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[57]

ABSTRACT

A hydrogen preparing apparatus is disclosed which reforms a hydrocarbon and/or a hydrocarbon containing an oxygen atom to obtain a hydrogen-containing gas and separates hydrogen from this hydrogen-containing gas. The apparatus includes a porous substrate and a hydrogen separating film which is formed on a predetermined surface portion of the porous substrate and which selectively separates hydrogen, a reforming catalyst for reforming the hydrocarbon being supported in the pores of the porous substrate. A reforming catalyst for reforming the hydrocarbon is supported on a honeycomb carrier, and the hydrogen separating film is arranged on the downstream side of the honeycomb carrier. The surface area of the catalyst per unit volume of the apparatus can be increased, whereby the apparatus can be miniaturized. A hydrogen separating efficiency can also be improved. The hydrogen manufacturing apparatus can be prevented from being damaged by a difference of expansion between the porous substrate and the container.

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[51] **Int. Cl.⁶** B01J 7/00[52] **U.S. Cl.** 48/61; 48/127.9; 48/DIG. 5[58] **Field of Search** 48/61, 127.9, 198.2, 48/198.3, 198.8, DIG. 5; 423/652[56] **References Cited****U.S. PATENT DOCUMENTS**

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4 Claims, 5 Drawing Sheets